

Structure and Relaxation of Polyimides Using Small Angle X-ray Scattering	X12B
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The thermoplastic polyimide, NEW-TPI, has been investigated using small angle X-ray scattering and thermally stimulated depolarization current measurements. SAXS was used to study the development of lamellar structure during isothermal or non-isothermal crystallization. The one-dimensional electron density correlation function was used to determine the structural parameters, such as long period, lamellar thickness, and linear crystallinity. The long period, lamellar thickness, and amorphous layer thickness all increase as the crystallization temperature increases from 300C to 360C. By combining melting point data with SAXS results we determine the side and fold surface free energy for the crystals, which are 29+/-3 and 41+/-3 ergs/cm-cm, respectively. Real-time SAXS was carried out during non-isothermal heating at 5C/min. The long period decreases while the lamellar thickness, linear crystallinity, and inter-phase thickness increase with increasing temperature. Results are interpreted using a lamellar insertion model.

Sharon X. Lu, Peggy Cebe, and Malcolm Capel, "NEW-TPI Thermoplastic Polyimide: Structure and Relaxation Using SAXS and TSDC" J. Applied Polymer Science, vol. 57, 1359-1372 (1995).